Current Distribution and Habitat of the Lowland Leopard Frog and Colorado River Toad

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Study Organism

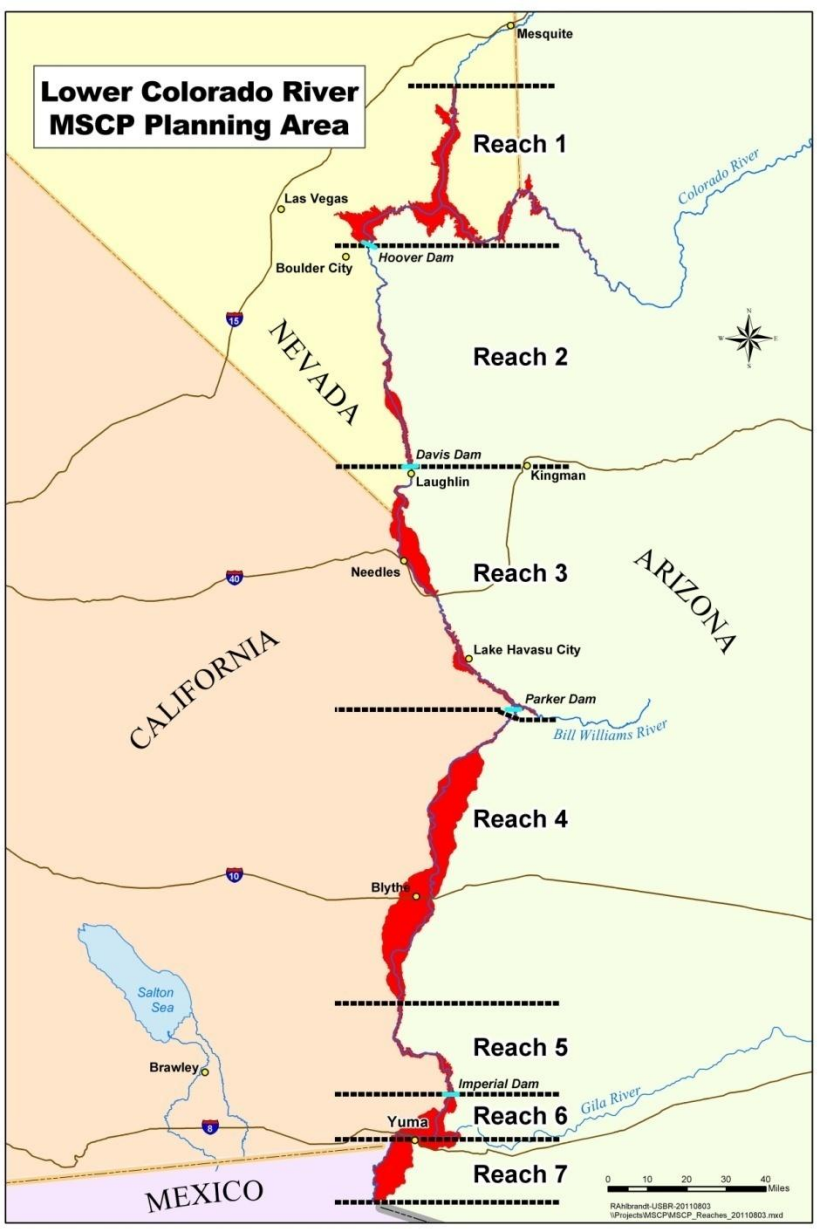
- *Lithobates yavapaiensis* (Lowland Leopard Frog)
- Spring Breeder
- Variety of habitats with semi-permanent water
- Do well with periodic flooding

Study Organism

Incilius alvarius
(Colorado River Toad)

-Monsoon Breeders

-Primarily found in arroyos and desert washes.



Study Area/Objectives

-Determine current distribution along the LCR and lower Bill Williams River

-Quantify habitat characteristics where individuals are found

Survey Methods

Four techniques

-Spotlighting and visual surveys

-Auditory surveys

-Dip net and funnel traps
targeting tadpoles and aquatic predators

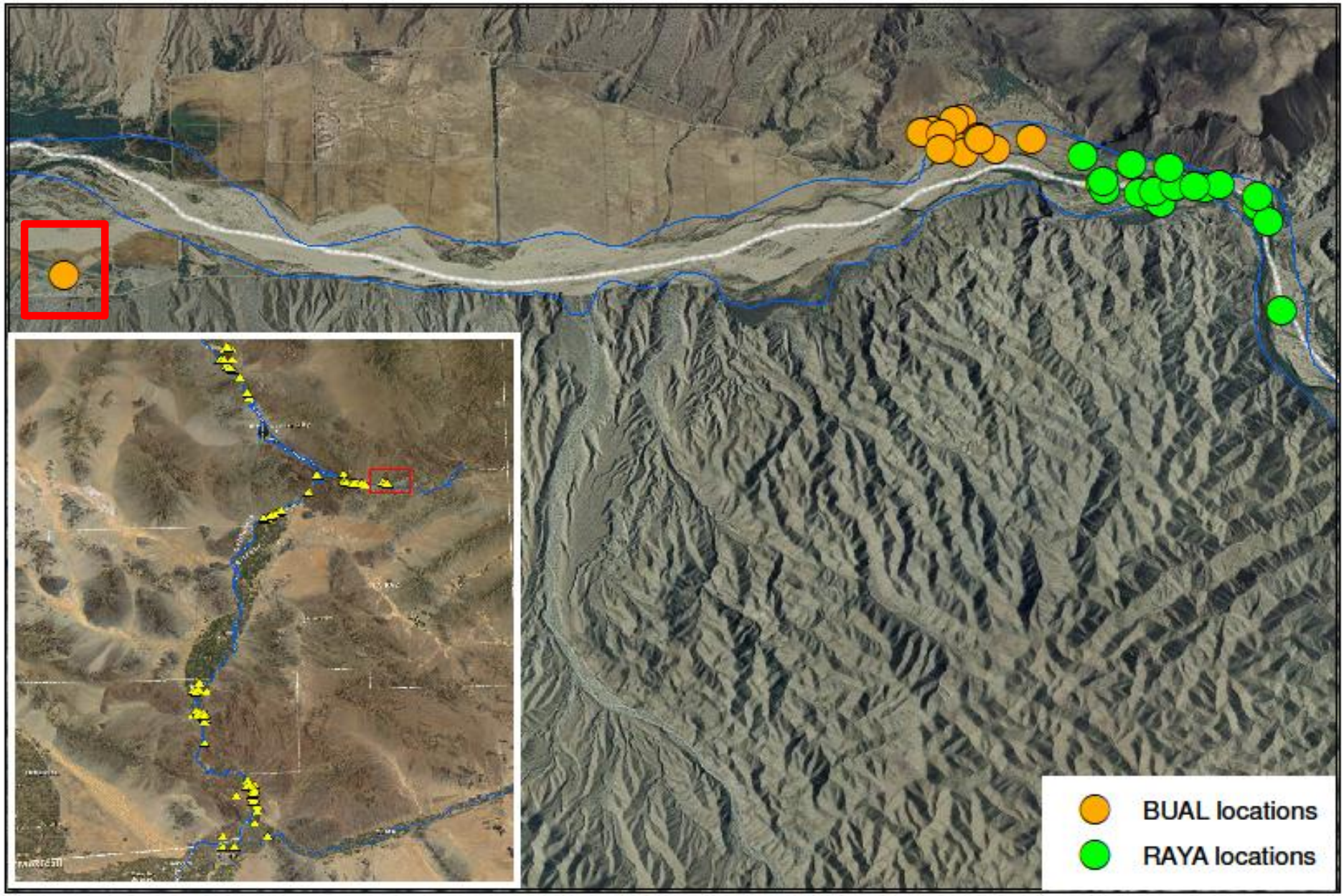
-eDNA samples

Update

-Lowland Leopard Frog not observed on main channel of the LCR since 1974

-Colorado River Toad several anecdotal reports, not observed on the main channel in over a decade

-Populations of both species observed east of BWRNWR in 2012



N
W E
S

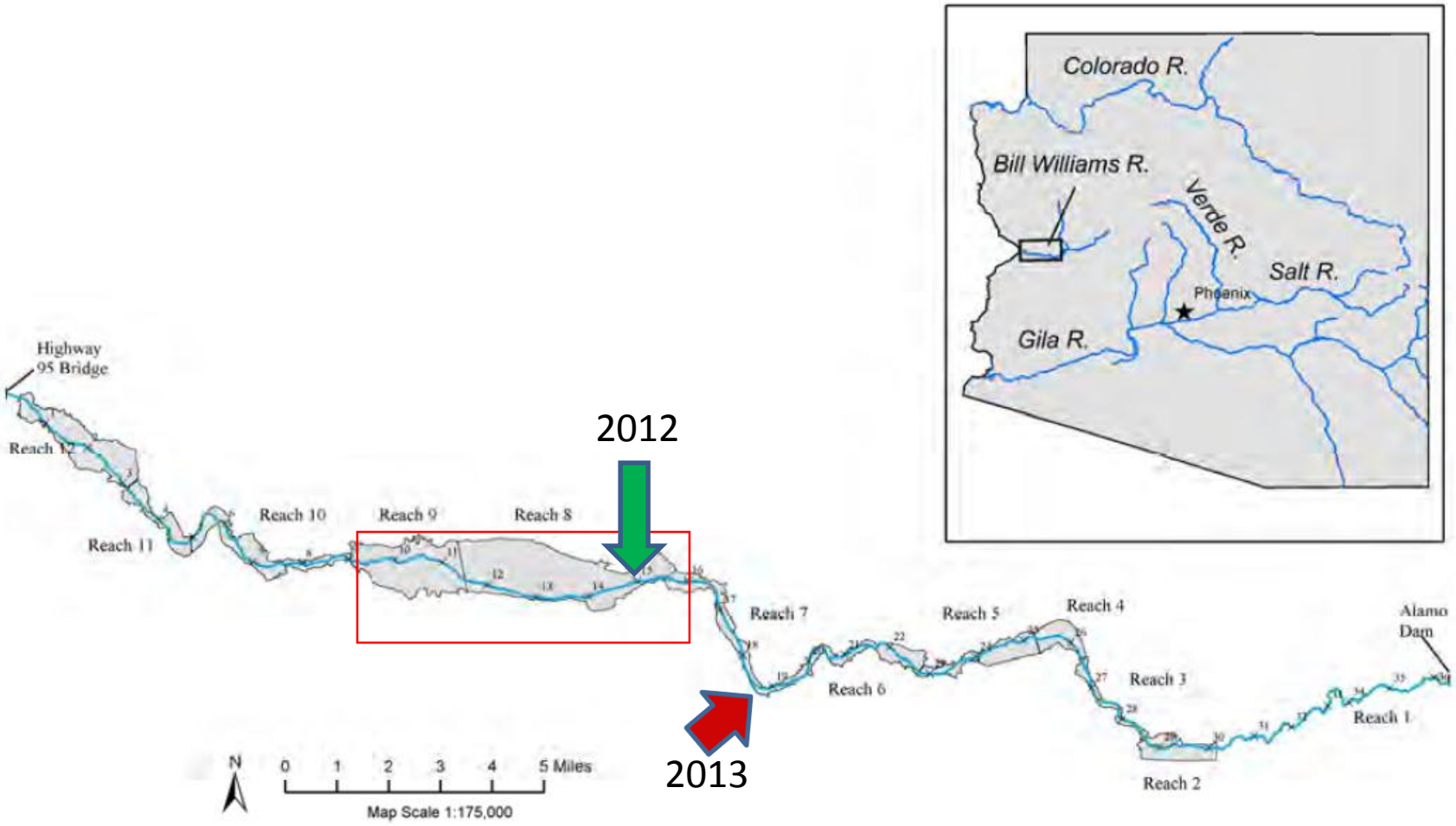
0 0.5 1 2 3 Kilometers

Focus for 2013

-More intensive habitat study east of Planet Ranch

-Fill in un-surveyed gaps in the study area. Including desert washes post monsoon.

-Collect eDNA samples throughout the study area


Colorado R.
Bill Williams R.
Verde R.
Salt R.
Phoenix
Gila R.
Highway 95 Bridge
Reach 12
Reach 11
Reach 10
Reach 9
Reach 8
2012
Reach 7
Reach 6
Reach 5
Reach 4
Reach 3
Reach 2
Reach 1
Alamo Dam
2013
N
0 1 2 3 4 5 Miles
Map Scale 1:175,000

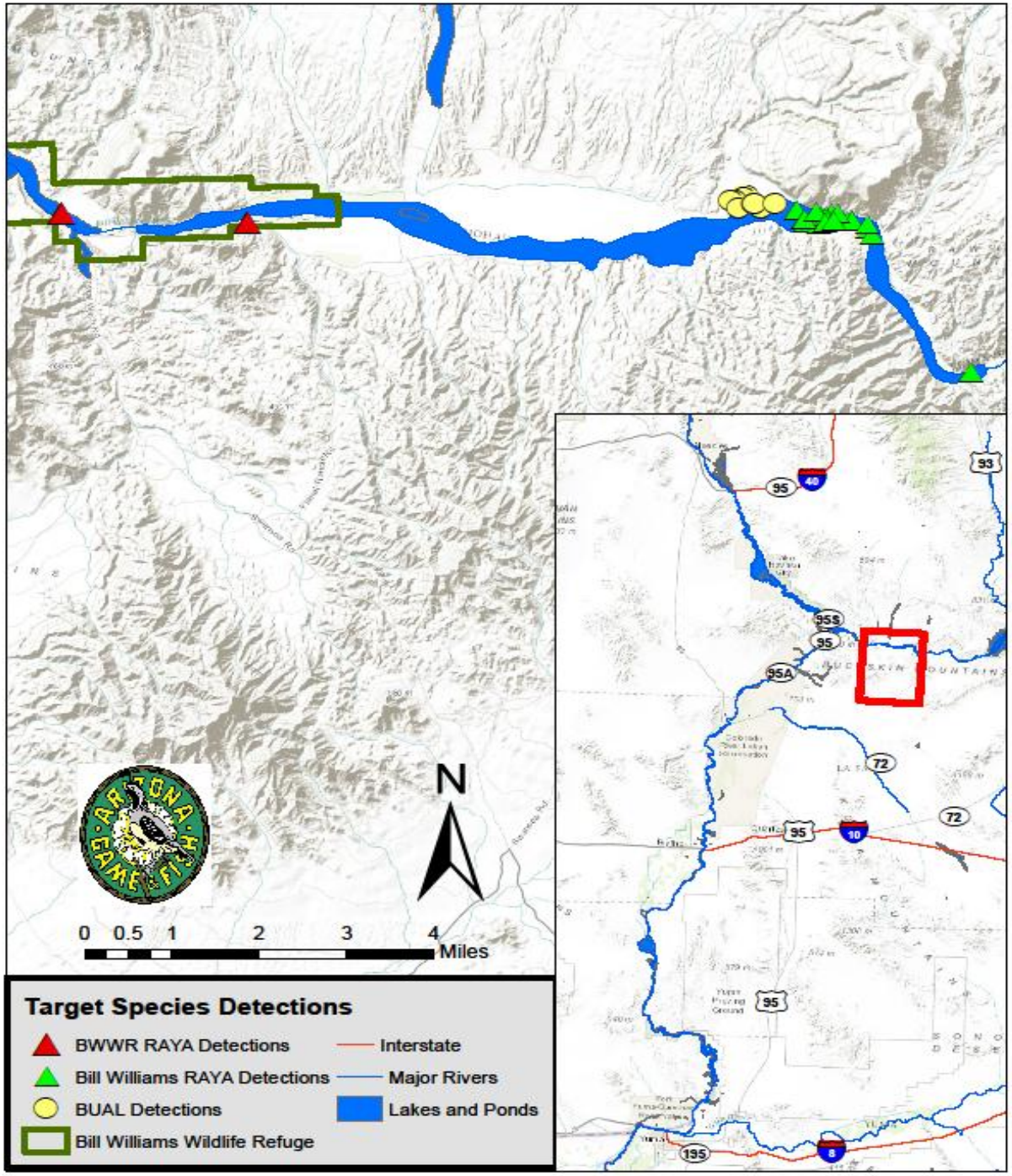
Results

-432 visual surveys conducted

-2,560 traps deployed at 260 different locations, and logged over 45,000 trap hours

- In addition to previous findings, two individual male leopard frogs on BWRNWR.

Needles
Lake Havasu City
BUCKSKIN MOUNTAINS
Colorado River Indian Reservation
LA PAZ
Quartzsite
Blythe
Yuma Proving Ground
Fort Yuma-Quechan Reservation
Yuma
YAVAPAI
Prescott National Forest
MARICOPA
GILA BEND MOUNTAINS
ORAN
ERT
N
0 5 10 20 30 40
Miles
Survey Locations
Interstate
Major Rivers
Lakes and Ponds


N
0 0.5 1 2 3 4
Miles
Target Species Detections
BWWR RAYA Detections
Bill Williams RAYA Detections
BUAL Detections
Bill Williams Wildlife Refuge
Interstate
Major Rivers
Lakes and Ponds
95
40
93
95S
95A
72
10
195
8

Results Continued…

L. yavapaiensis

	RAYA	BUAL	RABE	BUWO	BUCO	BUPU	BUMI	SCCO	PSRE	RACA
Bill Williams River National Wildlife refuge	X				X	X	X			
Havasu NWR				X	X				X	X
Cibola NWR				X	X					X
Ahakhav				X	X					X
Mittry/Imperial NWR			X							X
Gila River			X	X						X
Planet Ranch and Bill Williams River east of refuge	X	X			X	X	X	X		

Quantifying Habitat

-Within three days of a sighting, quantify ten meter radius around observation point and at least one non-site

-Water characteristics

-Vegetation cover

Logistic Regression

Leopard Frog Local models

Parameter	Unconditional Parameter Estimate	Unconditional Standard Error	Odds ratio	95% LCL	95%UCL
Maximum.Depth	-0.3646	0.2236	0.69	-0.803	0.074
Minimum.Depth	-1.5050	0.4704	0.22	-2.427	-0.583
Em	-0.0754	0.0192	0.93	-0.113	-0.038
Grass	-0.0536	0.0239	0.95	-0.100	-0.007
Cambarids	-2.8202	0.7450	0.06	-4.280	-1.360
Total.Open	0.2534	0.1375	1.29	-0.016	0.270

Leopard Frog Regional models

Mod. Number	Model	AIC_c	$_{\Delta}AIC_c$	Log(L)	AIC_c weight	K
50	Discharge + Maximum.Depth + Forb + Open.Terr.	32.07	0	-11.04	0.77	5
49	Maximum.Depth + Forb + Open.Terr	35.14	2.99	-13.48	0.17	4

Gradient Analysis

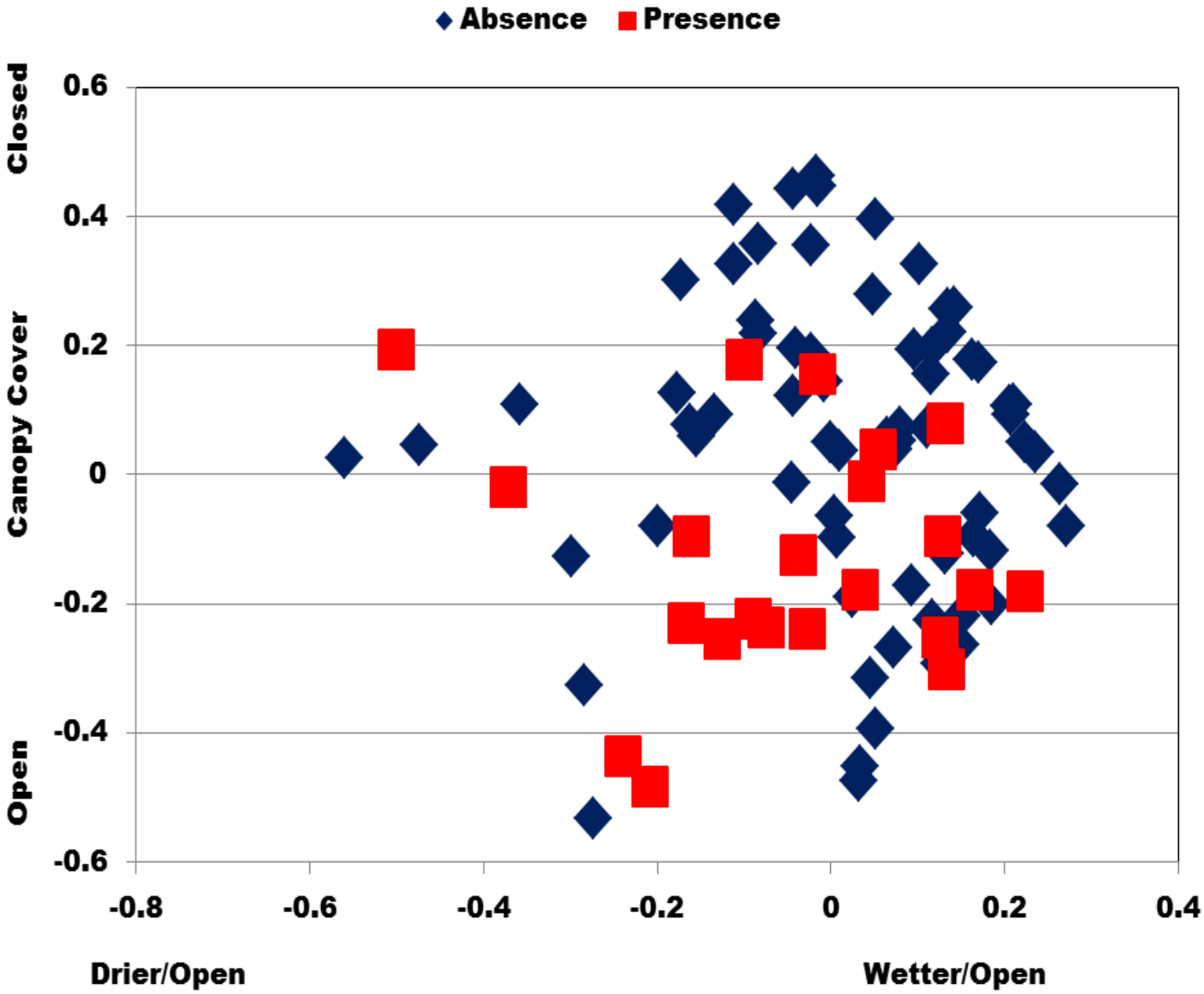
Principle Coordinates Analysis

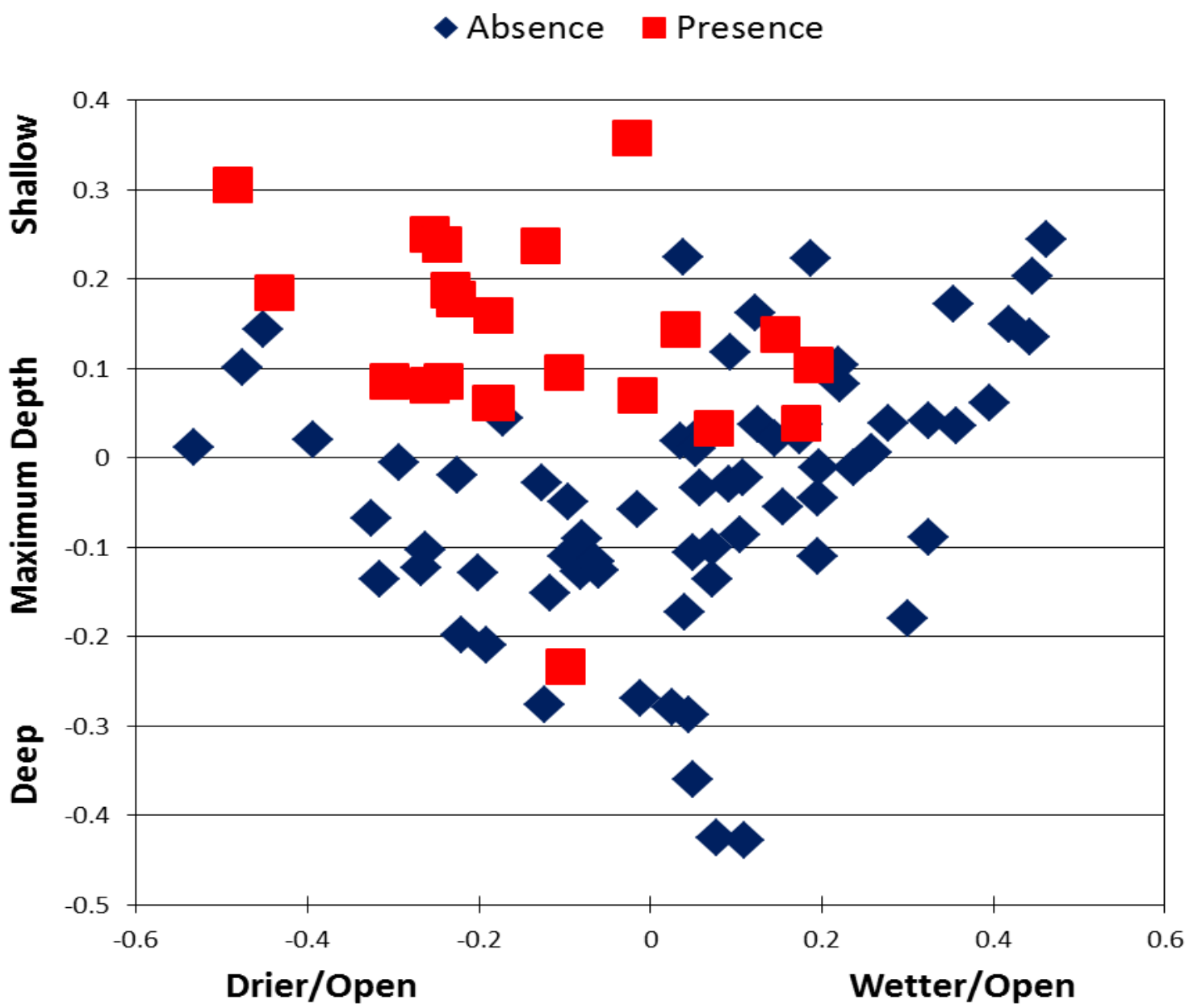
-Top three gradients related to

1. open areas with and without water
2. canopy cover
3. water depth

Accounted 68% of variation

DFA identified differences between data sets related to maximum depth and vegetation


Absence
Presence
Closed
Canopy Cover
Open
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
Drier/Open
Wetter/Open


Absence
Presence
Shallow
Maximum Depth
Deep
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
Drier/Open
Wetter/Open

Incilius alvarius

	Mean	Stnd. Deviation
Dist to Water	219.92m	16.71m
Open Terr.	78.59	8.75
Tot. Open	81.45	7.29
Em	2.5	1.75
Shrub	8.52	3.19
Forb	0.1	0.06
Tree	0.07	0.07
Grass	7.95	7.09

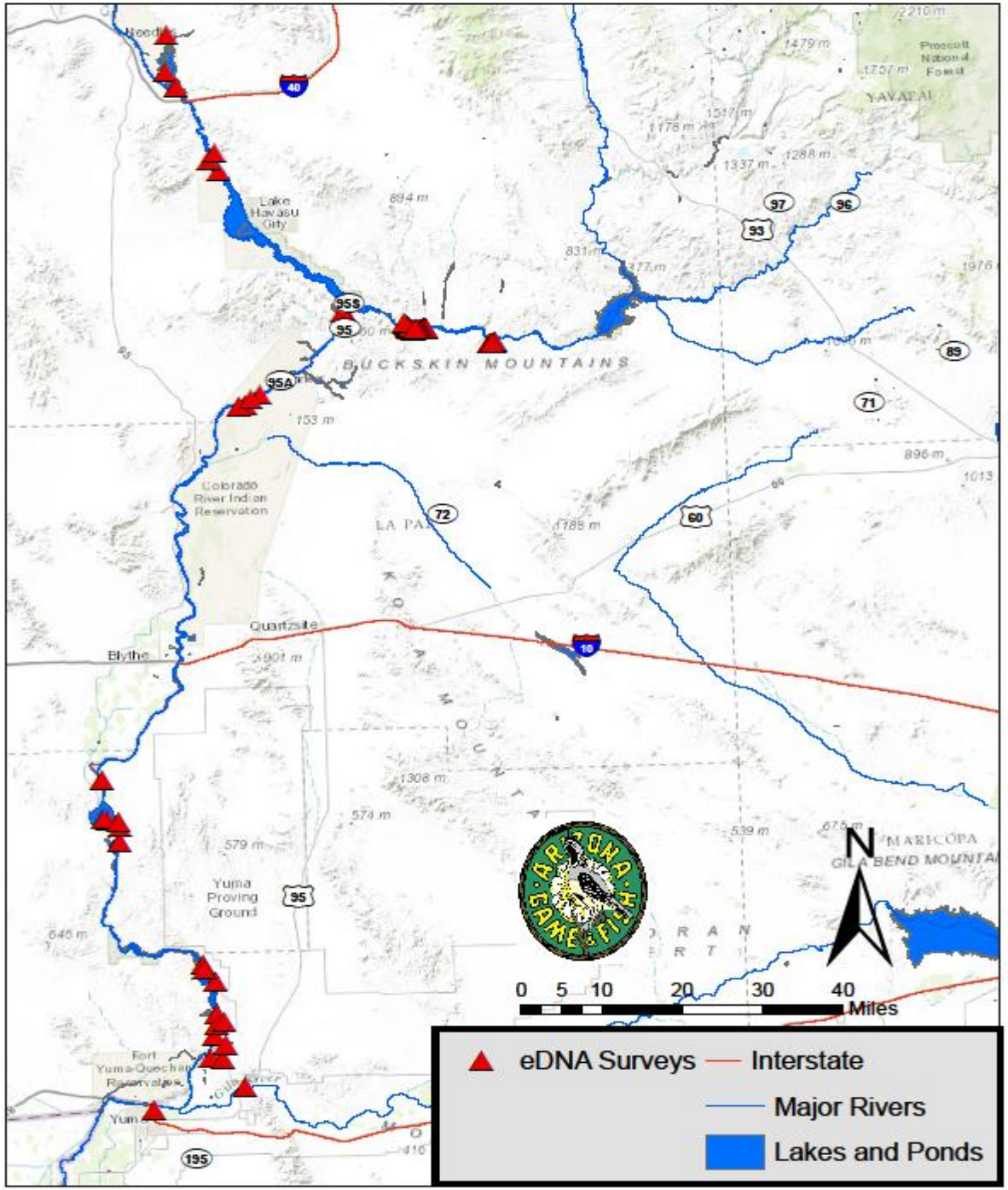
Monsoon rains

eDNA

-50 samples from BWRNWR

-30 samples from the LCR mainstem

- 20 samples from upstream of Planet Ranch (Swansea)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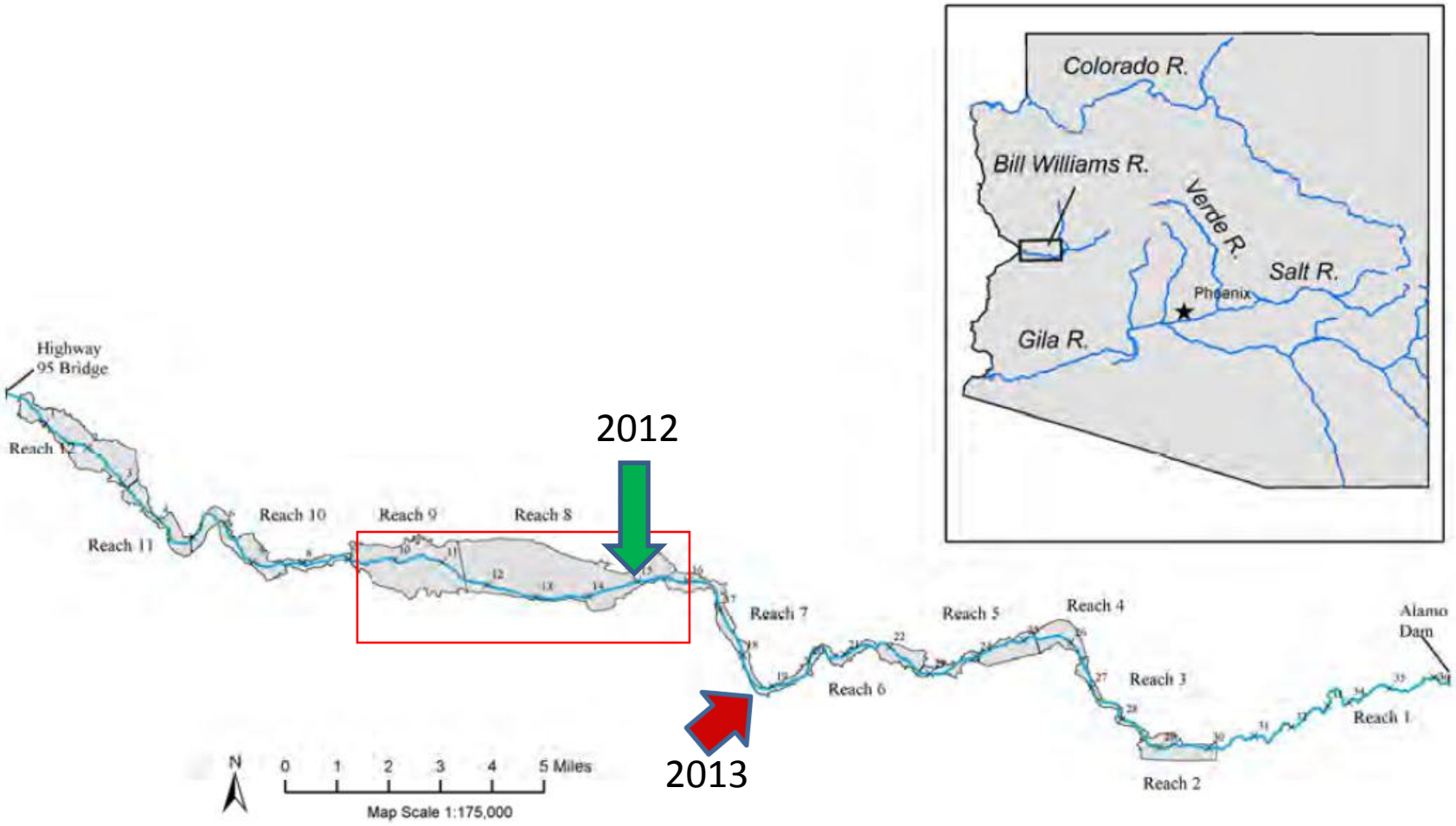
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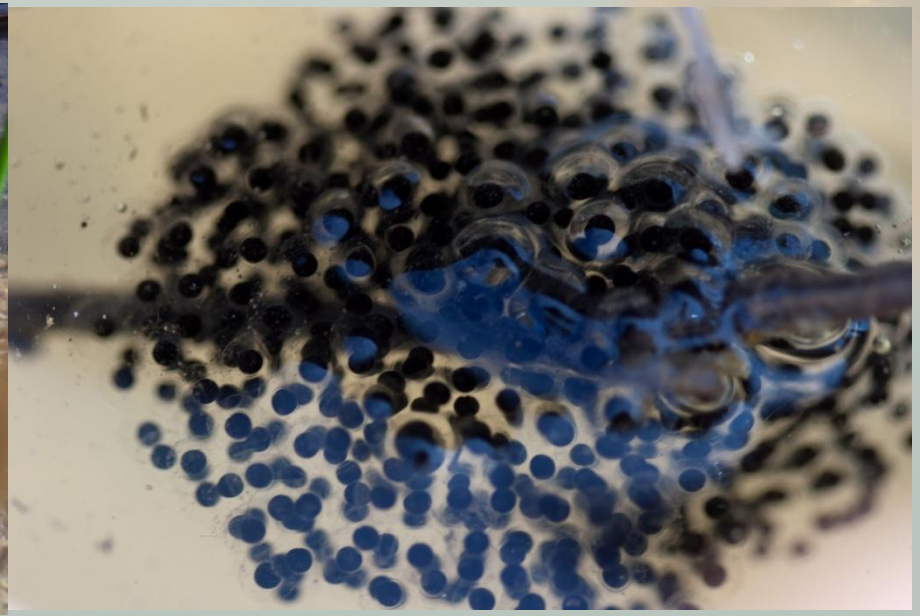
Reach 1
Alamo Dam
2013
N
0 1 2 3 4 5 Miles
Map Scale 1:175,000

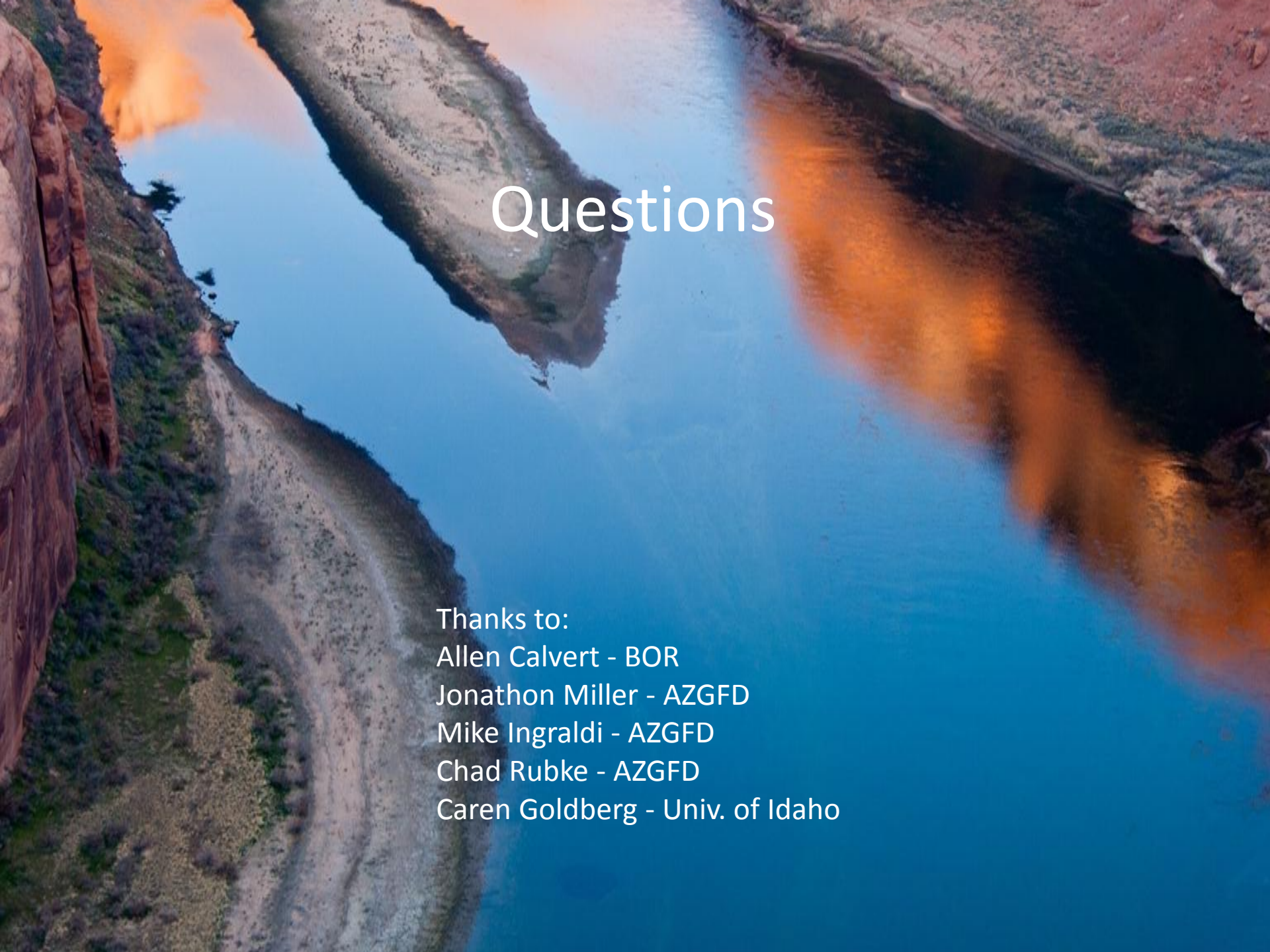
Future Plans

eDNA analysis

Evaluate and develop monitoring techniques. Including frog loggers and eDNA

Quantify habitat on Bill Williams, Agua Fria, and Verde Rivers. Focusing on breeding and oviposition sites.





Questions

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